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ABSTRACT

Research literature shows that people with access to attitude-relevant information in memory are able to draw on relevant beliefs and prior experiences when analyzing a persuasive message. This suggests that people who can retrieve little attitude-relevant information should be less able to engage in systematic processing. Two experiments were conducted with college students to test these ideas and to explore the relationship between retrieval and processing of message content. It was anticipated that the recipients would engage in a systematic processing strategy, actively attempting to comprehend, evaluate, and assess the validity of message arguments. Message positions judged to be valid on the basis of this analysis (messages delivered by expert sources or containing high quality arguments) were expected to be more persuasive than less valid ones (nonexpert sources or low quality arguments). Variation in cues that did not affect perceived message validity, such as source likability and message length were not expected to affect the recipients' opinions. It was further predicted that those who could retrieve little attitude-relevant information would follow a heuristic strategy, using simple decision rules to identify when the advocated position was the correct one to take. They were expected to be more persuaded when the position was associated with positive source cues (likable, expert) or positive message cues (long, high quality) than when it was associated with negative ones. These predictions were generally obtained between extent of retrieval and the persuasiveness of message and source attributes. In addition, retrieval was found to enhance recipients' comprehension and elaboration of message content. (Author/HOD)

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Access to Attitude-Relevant Information in Memory as a Determinant of Persuasion: The Role of Message and Communicator Attributes

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Abstract

People with access to attitude-relevant information in memory are able to draw on relevant beliefs and prior experiences when analyzing a persuasive message. Consequently, it was anticipated that these recipients would engage in a systematic processing strategy, actively attempting to comprehend, evaluate, and assess the validity of message arguments. Message positions judged to be valid on the basis of this analysis (i.e., messages delivered by expert sources or containing high quality arguments) were expected to be more persuasive than less valid ones (nonexpert sources or low quality arguments). Variations in cues which did not affect perceived message validity, such as source likability and message length, were not expected to affect these recipients' opinions. In contrast, people who can retrieve little attitude-relevant information should be less able to engage in systematic processing. Instead, it was predicted that they would follow a heuristic strategy, using simple decision rules to identify when the advocated position is the correct one to take. They were expected to be more persuaded when the position was associated with positive source cues (likable, expert) or positive message cues (long, high quality) than when it was associated with negative ones. The predicted relations were generally obtained between extent of retrieval and the persuasiveness of message and source attributes. In addition, retrieval was found to enhance recipients' comprehension and elaboration of message content.

Access to Attitude-Relevant Information in Memory as a Determinant of Persuasion: The Role of Message and Communicator Attributes

Social psychological theorizing about attitudes has tended to emphasize the importance of either internal cues (Fishbein & Ajzen, 1975) or external factors (Bem, 1972) as the basis for attitude judgments. Recent information-processing analyses have focused on the impact of both kinds of information on opinions (Chaiken & Baldwin, 1981; Eagly & Himmelfarb, 1978), and research has supported the idea that attitude-relevant internal cues as well as external factors should be considered when predicting opinion judgments (Wood, 1982).

To explore the impact of internal and external cues, previous research first assessed subjects' retrieval of attitude-relevant information from memory (Wood, 1982). Access to relevant beliefs was assessed by giving subjects two minutes to list characteristics and attributes of an opinion topic, and access to relevant prior experiences was assessed through their listing of prior actions. The time limit restricted subjects to indicating only easily accessible beliefs and behaviors.

It is assumed that subjects' responses on these retrieval measures are a function of the way attitude-relevant information has been encoded and organized in memory. People learn about opinion topics sequentially over time, as they repeatedly encounter the attitude object. If, during the process of learning information, each new item of data is related to other, already acquired pieces of information, an interlocking network of associations in memory is likely to be formed among the various items. The existence of such a network seems to facilitate later recall of the information one has acquired (Hamilton, Katz, & Lierer, 1980; Wyer & Carlston, 1979). Items of

information that are not incorporated into a network of associations appear to be relatively more difficult to retrieve at a later point.

This cognitive interpretation of the retrieval measures suggests that subjects with a high degree of access have a highly organized structure in memory which facilitates storage and retrieval of attitude-relevant beliefs and experiences. People with this cognitive structure should process new information, such as that contained in a persuasive message, by relating it to the data already stored in memory, and thus should easily recall at a later time the particular arguments used in a message. People without this kind of organization should be less successful at recalling specifics of the message content. A cognitive interpretation of the retrieval measures, however, remains tentative because previous research obtained little relation between retrieval and comprehension and retention of message arguments (Wood, 1982). Therefore, one purpose of the present research was to further explore the appropriateness of this analysis.

Persuasiveness of External Cues

A major focus of prior work was how access to internal cues affects responsiveness to variations in external cues (Wood, 1982). In one experiment, subjects were presented with a counterattitudinal persuasive message, and in another experiment they were given the opportunity to derive their attitude from a recent behavioral incident. Subjects with access to relevant information in memory appeared to use these data to critically evaluate the message or the behavioral incident and consequently the new information had little impact on their opinions. In contrast, subjects with less access were forced to rely relatively more on currently available cues when forming their attitude judgments and thus showed greater change toward the message or the behavior.[1]

The information processing strategy used by message recipients with high levels of retrieval can be understood in terms of a systematic or central route to persuasion (Chaiken, 1980; Petty, Cacioppo, & Goldman, 1981). According to this view, recipients actively attempt to comprehend and evaluate the arguments in a message and to assess their validity in relation to the message's conclusion. To conduct this kind of detailed analysis, recipients must be willing to exert the cognitive effort to process message content (Chaiken, 1980). Another condition for this analysis may be that recipients have the ability to conduct a critical evaluation of the message, that is, the ability to draw on their own beliefs and prior experiences during processing (Petty & Cacioppo, 1981). Extent of retrieval, along with situational factors such as message repetition and distraction, can be expected to affect subjects' ability to process a message. Recipients with high levels of retrieval should be able to marshall the internal support necessary to critically evaluate new information and thus are likely to follow a systematic processing strategy.

The beliefs and prior experiences retrieved from memory are likely to represent a highly valid, trustworthy source of information on which to base one's opinions. If high retrieval recipients follow a systematic strategy, these valid internal data will be used to evaluate the message. Messages are likely to prove persuasive only when, on the basis of this analysis, they are judged to provide a veridical perspective that is difficult to refute. High quality messages supported by factual evidence are likely to be judged valid, and thus should be more persuasive than poor quality messages. To the extent source cues are informative concerning validity, persuasion might also be affected by the source's identity. In particular, the opinions of experts may be more persuasive

than nonexperts' opinions, given that experts have been defined as sources of valid assertions (Hovland, Janis, & Kelley, 1958) and as those who know the correct stand to take on an issue (McGuire, 1968). In contrast, variations in cues which do not affect perceived message validity should have little impact on these recipients' opinions. Messages from likable sources or particularly lengthy messages may therefore be no more persuasive than messages from unlikable sources or short messages.

Message recipients with access to little attitude-relevant data, however, are less able to evaluate new information against beliefs and prior experiences stored in memory. Instead, they are likely to follow a heuristic or peripheral route to persuasion (Chaiken, 1980; Petty, Cacioppo, & Goldman, 1981), which involves the use of general rules, or cognitive heuristics, developed by people through their past experiences and observations. These rules feature basic cues associated with the message position, such as food or pain, or secondary cues, such as source credibility or attractiveness (Petty, Cacioppo, & Goldman, 1981). Attitudes change, from this view, because the attitude object is associated with positive or negative cues, not because recipients engage in an extensive evaluation of the issue-relevant arguments.

If recipients with low levels of retrieval employ a heuristic strategy, they should find messages from sources with positive characteristics (e.g., likable, expert) more persuasive than messages from sources with negative ones (unlikable, nonexpert). In addition, attributes of the message could be processed by low retrieval recipients in a heuristic manner. A message with positive features, such as lengthy arguments, may be more persuasive than messages

with less positive features, such as short arguments. Also, low retrieval subjects may be able to evaluate the quality of message arguments by, for example, noting whether they are supported by statistical evidence or rely on information derived from credible sources. Using these simple decision rules, then, low retrieval recipients may find strong messages more persuasive than weak ones.

The Present Research

To summarize the present analysis, people with access to attitude-relevant information in memory are expected to evaluate new data against this information. Only if the new data is judged to provide a highly valid perspective will it be incorporated into subjects' attitude judgments. The opinion change of subjects with little access, in contrast, should be a function of the positive or negative cues associated with the advocated position. The two experiments reported in this paper tested these ideas and also explored the relation between retrieval and processing of message content.

The first experiment manipulated one attribute of the message, its length, which should have few implications for message validity, and another attribute, quality of argumentation, which should be closely associated with validity. It was anticipated that subjects with access to relevant information would be more persuaded by high quality than low quality messages, but would be little affected by variations in length. Subjects with little access, in contrast, were expected to find messages with positive attributes (i.e., long, high quality arguments) more persuasive than ones with more negative attributes (i.e., short, low quality arguments). Thus, the opinion change predictions involved an interaction between retrieval and message length, since length should affect low but not high retrieval subjects. Argument quality, in contrast, was expected to affect opinion change of both high and low

retrieval recipients.

EXPERIMENT 1

Method

Subjects

One hundred twenty University of Wisconsin-Milwaukee psychology students participated in a two-session study on attitude assessment for extra course credit. Two subjects participated only in the first session and thus are not included in the analyses. Subjects participated in both sessions in groups of about 12.

First Session: Procedure

Subjects completed questionnaires assessing their opinions and other responses to seven social issues, including the message topic, preservation of the environment (see below).

Measuring Instruments

Opinions. Subjects indicated their initial opinions on the topic "preservation of the environment" on a 15-point scale anchored by "very favorable" and "very unfavorable."

Belief retrieval. To determine the extent to which subjects could retrieve attitude-relevant beliefs, they were given 2 min. to list on a questionnaire the characteristics and facts they believed to be true about each of several issues, including preservation of the environment (see Wood, 1982). The number of discrete beliefs each subject listed about preservation was judged by two independent raters (r = .99).

Behavior retrieval. To assess subjects' retrieval of attitude-relevant experiences, they were given 2 min. for each topic to list specific instances of times when they had engaged in relevant actions. The number of discrete

behaviors each subject listed about preservation was judged by two raters (r = .94).

Second Session: Procedure

Subjects returned one to two weeks later to complete the second session, in which they again expected to indicate their opinions in a variety of formats. The rationale, adapted from Jones and Brehm (1967), for preceding the opinion questionnaire by a persuasive message was that being exposed to someone else's opinion and the arguments he or she uses to support this opinion gets people in the "right frame of mind to be critical and careful about evaluating their own opinions" and therefore makes it possible to measure their opinions more accurately.

The experimenter distributed a handout explaining that each subject would read a transcript of an interview (actually hypothetical) that had been tape recorded as part of an opinion survey conducted on campus. Participants in this survey, including students, faculty, staff, and visitors, had (supposedly) been asked to give an opinion on an issue and then to support that opinion with evidence.

The experimenter then gave each subject the interview transcript, which contained the persuasive message. The transcript began with an interviewer asking an interviewee (source), for some background information. The source was portrayed as a graduate student in biology. In response to the interviewer's question, the source stated that, "I am not very strongly in favor of preservation." His reasons for stating an antipreservation position comprised the experimental manipulations (see below).

After reading the transcripts, subjects completed a questionnaire that assessed their opinions on a variety of social issues, including preservation.

The experimenter then explained that she was also interested in subjects' reactions to the interviews. Subjects completed a questionnaire that elicited their thoughts about the transcript, along with other responses (see below). Finally, subjects were debriefed and excused.

Independent Variables

Message quality. The arguments presented in the message were chosen through pretesting to present either strong or weak support for an anti-preservation position. The strong arguments were supported by factual evidence derived from credible sources, such as the "Wall Street Journal," whereas the weak arguments relied on less credible support, such as the opinions of a friend's father who was on the board of directors of an automobile company in Detroit.

The message containing strong arguments stated, essentially, that: (a) environmental regulations inhibit economic growth, increase unemployment, and cut into capital normally used for such things as worker safety controls and worker retirement benefits; (b) given continued increases in the World's population, preserved land will be needed for farming so that the US can supply enough grain to less developed countries; and (c) to reduce our dependence on foreign oil we need to increase reliance on native coal and shale oil. The weak message included the following three arguments: (a) future generations will not be around to appreciate the environment--the nuclear arms build up in the Soviet Union and the US will result in a third world war which will destroy most of the life on this planet; (b) industrialists in this country do not want to preserve because environmental controls reduce the amount of money they can make; and (c) reliance on coal is necessary to solve the energy crisis, even though it would adversely affect air

quality by increasing the levels of sulfer dioxide and particulates in the atmosphere, along with acid rain.

The vocabulary level in the strong and weak messages was approximately the same and pretest ratings indicated that the message arguments were comparable in how easy they were to understand.

Message length. Two versions of each argument were developed, one long and one short, and interview transcripts were composed of three short or three long arguments. Although the long arguments were somewhat wordier and contained more detail than the short ones, both versions of each argument presented essentially the same information, and in fact were rated similarly by pretest subjects in terms of strength and ease of comprehension. The average number of words in the long arguments was 160 for strong messages and 158 for weak messages. The average number of words in the short arguments was 83 for strong messages and 71 for weak messages.

Measuring Instruments

Opinions. Subjects' final opinions concerning preservation were assessed on the same scale used to assess their initial opinions.

Cognitive responses. Subjects were given 2.5 min. to list their thoughts about what the communicator said in the message. Two independent raters judged the number of positive (r = .89), negative (r = .93), and neutral (r = .76) thoughts each subject produced. In addition, raters judged the extent to which thoughts reflected information given in the message vs. recipients' own ideas and knowledge (Cacioppo, Harkins, and Petty, 1981; Greenwald, 1968). This classification scheme yields three categories: message originated thoughts, modified-message originated thoughts, and recipient generated thoughts. Examples of statements placed in each category, along with inter-

rater reliability coefficients are: message originated (r = .92), "He was worried about enough food to feed people in underdeveloped countries;" modified-message originated (r = .84), "I thought he knew what he was talking about;" recipient generated (r = .81), "Jobs now won't make the U.S. feel better about Love Canals, unsafe drinking water, black lung, etc. later."

Perception of the communicator. Subjects rated the communicator on 15-point bipolar scales with positive poles being expert, well-read, and knowledgeable. These ratings proved to be highly correlated (rs ranged from .60 to .75) and were combined into an index representing source expertise.

Perception of the message. On 15-point scales, subjects rated the strength of the message arguments, how carefully the message was thought out, how convincing it was, and how fairly it evaluated the evidence. These ratings proved to be correlated (rs ranged from .52 to .72) and were combined into an index representing message validity.

Other measures. Subjects were asked to summarize each argument that the communicator used to support his position, and two independent judges determined the number correctly recalled (r = .78). Subjects were also asked to write down the overall position the communicator took in the interview. Two judges classified these responses as representing no recall, partial recall, or accurate recall (r = .77). Six subjects (retained in the analysis) were judged to have no recall of the message position.

Results and Discussion

The number of beliefs each subject indicated concerning preservation of the environment and the number of behaviors each indicated were summed to form a retrieval index.[2] A median split (median = 7) was performed on this index, and Extent of Retrieval (low vs. high) x Argument Strength (strong vs. weak)

x Argument Length (long vs. short) analyses of variance were calculated, along with appropriate contrasts.

Perceptions of Message Validity and Source Expertise

Analyses on the index of message validity (see Table 1) revealed that

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Insert Table 1 about here

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the argument strength manipulation was appropriately perceived: Messages with strong arguments were judged considerably more valid than messages with weak ones, F (1, 112) = 123.81, $p < .001$.

Analyses on the communicator expertise index (see Table 1) revealed that the communicator was considered more expert when delivering a strong than weak message, F (1, 112) = 49.01, $p < .001$. In addition, the communicator was rated somewhat more expert when his message was long rather than short, F (1, 112) = 2.87, $p < .10$.[3]

Opinions

Analysis of covariance was conducted on the postopinions, with preopinions as the covariate. A test for homogeneity of the covariate regression coefficients indicated that they did not differ across experimental conditions. Analysis of variance indicated that the preopinions did not vary across conditions, and that preopinions (M = 13.82) differed significantly from postopinions (M = 11.79, $p < .01$).

Opinion means, which are the postopinion scores adjusted on the basis of the analysis of covariance, appear in Table 1. Consistent with prior work (Wood, 1982), low retrieval subjects tended to change their opinions more than high retrieval subjects, F (1, 111) = 3.05, $p < .10$. Also, strong messages were more persuasive than weak ones, F (1, 111) = 5.63, $p < .02$. Although the predicted interaction between argument length

and retrieval did not reach significance ($p < .24$), planned comparisons revealed that , as anticipated, long messages were significantly more persuasive than short ones for low retrieval recipients, F (1, 111) = 7.86, $p < .01$, whereas message length had no effect on the opinion change of high retrieval recipients ($F < 1$).

These findings, then, provide support for the idea that high retrieval recipients are especially concerned with the validity of external cues. Messages containing strong arguments were judged to provide a valid perspective on the opinion topic and were more persuasive for these subjects than the less valid messages containing weak arguments. High retrieval recipients, however, did not find long messages more persuasive than short ones, presumably because length had relatively little effect on perceptions of message validity. In contrast, low retrieval recipients found messages with positive attributes (i.e., long, high quality arguments) more persuasive than messages with negative attributes (short, poor quality arguments).

Cognitive Responses

High retrieval subjects tended to list more thoughts than low retrieval ones ($p < .05$). Therefore, for each subject, the number of thoughts in each category was divided by the total number of thoughts listed, and analyses were calculated on this proportion (see Table 1).

Replicating previous work (Wood, 1982), high retrieval recipients, compared with low, listed a smaller proportion of favorable thoughts, F (1, 112) = 5.28, $p < .05$, and a slightly larger proportion of counterarguments, F (1, 112) = 2.90, $p < .10$. Also, strong messages elicited proportionally more favorable

thoughts and fewer counterarguments than weak ones (ps <.001). These effects of retrieval and strength on favorable thoughts were modified by a Retrieval $\bar{x}$ Strength interaction (p <.06). Although both high and low retrieval recipients indicated a larger percent of favorable thoughts to strong than weak messages, this effect was highly significant for low retrieval recipients (p <.001) and marginally significantly for high retrieval recipients (p <.10). In addition, short messages were found to elicit a slightly higher percent of counterarguments than long messages (p <.10). No effects were obtained in the analysis on neutral thoughts.

Analyses on the origin of subjects' thoughts revealed that high retrieval subjects produced a somewhat larger proportion of recipient generated thoughts than low retrieval subjects, F (1, 112) = 2.46, p <.13. High retrieval recipients also produced a smaller proportion of modified-message originated thoughts than low retrieval recipients (Ms = .58 vs. .74, respectively, p <.02). In addition, a higher percent of recipient generated thoughts was produced to strong messages than to weak ones (p <.05).

These cognitive response findings are consistent with the idea that high retrieval recipients were more likely than low retrieval ones to use information accessed from memory to evaluate the message. This can be seen from the smaller proportion of favorable thoughts, larger proportion of recipient generated thoughts, and somewhat larger proportion of counterarguments produced by high (vs. low) retrieval subjects. In addition, the cognitive response findings generally paralleled the effects obtained on opinion change. Both low and high retrieval subjects generated a larger percent of counterarguments and a smaller percent of favorable thoughts to weak than strong messages. Low

retrieval recipients also generated a somewhat larger percent of counterarguments to short than long messages. Unlike opinion change, however, length also affected high retrieval recipients' counterarguing.

Comprehension and Recall of Message Position

High retrieval recipients processed the message in a way that tended to enhance comprehension and retention of message arguments. High retrieval subjects recalled slightly more message arguments than low retrieval subjects (*Ms* = 2.72 vs. 2.54, *p* <.11). No effects were obtained in the analysis on recall of the advocated position.

Correlational Analyses

Analyses were conducted to explore the relation between opinion change and possible mediators of change, including the source and message ratings, cognitive responses, and message comprehension. Partial correlations were calculated between opinions and each of these mediators, adjusted for the experimental variations--subjects' retrieval, source expertise, and source likability. A perception of the message as high quality was found to enhance opinion change (*r* = .25, *p* <.02), and the generation of counterarguments tended to decrease opinion change (*r* = -.17, *p* <.10).

EXPERIMENT 2

Given the small magnitude of the effects obtained in Experiment 1, it was considered desirable to explore further the effects of retrieval on persuasion. A second study was conducted which tested the hypotheses by manipulating attributes of the message source rather than attributes of message content. Variations in one source attribute, expertise, were expected to affect the perceived validity of the message position, whereas variations in a second attribute, likability, should have few implications for validity.

Similar to the predictions of Experiment 1, it was anticipated that high retrieval recipients would be more persuaded by highly valid external cues than less valid ones. Therefore, these recipients should find expert communicators more persuasive than nonexpert ones, whereas source likability should have little impact on their opinions. Subjects with little access, in contrast, were expected to find sources with positive attributes (i.e., expert, likable) more persuasive than ones with negative attributes (i.e., nonexpert, unlikable). The opinion change predictions thus involved an interaction between retrieval and source likability, since likability should affect the opinions of low but not high retrieval subjects. Expertise, in contrast, was expected to affect the opinion change of both high and low retrieval recipients.

Method

Subjects

One hundred five University of Wisconsin-Milwaukee psychology students participated in a two-session study on attitude assessment for extra course credit. Two subjects participated only in the first session and thus are not included in the analyses. Subjects participated in both sessions in groups of about 12.

First Session

The procedure and measuring instruments used in this session were identical to that described in Experiment 1, except that subjects in this study also completed the self-perception measures described in Wood (1982).

Second Session: Procedure

The procedure for this session was identical to that in the first experiment except for the interview transcripts subjects received. In this study, the message arguing against preservation of the environment contained three supporting arguments which were designed to be of moderate strength. The message argued essentially that (a) strict environmental standards have a negative impact on the economy, (b) one solution to the current energy problem is to use coal and shale oil, and (c) preserved land is needed for housing and farming. The message source was described as a graduate student at UWM and the background information he gave at the beginning of the interview was varied to comprise the experimental manipulations (see below).

Independent Variables

Source expertise. The expertise of the source on the message topic was varied through his graduate major and previous work experience. The expert source was described as a graduate student in environmental geology whose previous experience included work on projects identifying new fossil fuel resources and evaluating the reclamation of strip-mined land. The nonexpert source was described as a graduate student in French whose work experience involved the development of a bilingual reading program and teaching French to employees of a bank.

Source likability. The manipulation of source likability was similar to that used by Chaiken (1980). The likable source indicated that he had transferred to the University of Wisconsin-Milwaukee a year ago from Boston University. He praised UWM in comparison to BU, arguing that UWM "faculty are more involved with their students and the students themselves are more involved in the school and their education." Further, he praised UWM undergraduates,

indicating that the ones he had met were "responsible, intelligent, mature people who are concerned, in general, with their role in society." The unlikable source said that he found BU to be a better school than UWM and that he had found UWM undergraduates to be irresponsible and immature.

Measuring Instruments

The study used the same opinion, cognitive response, argument comprehension, and position recall measures as Experiment 1.

Perception of the source. Subjects rated the communicator on 15-point bipolar scales with the following positive poles: expert, competent, knowledgeable, open-minded, unbiased, well-read, intelligent, approachable, interesting, warm, sincere, likable, friendly, and modest.

Perception of the message. On 15-point scales, subjects indicated how fairly the message evaluated the evidence and how carefully it was thought out. These ratings proved to be correlated (r = .47) and were combined into an index representing message validity.

Results and Discussion

The number of beliefs subjects indicated concerning preservation of the environment and the number of behaviors were summed to form a retrieval index. A median split (median = 7) was performed on this index, and Extent of Retrieval (low vs. high) x Source Expertise (expert vs. nonexpert) x Source Likability (likable vs. unlikable) analyses of variance was calculated, along with appropriate contrasts.[4]

Self-Perceptions of Past Experiences, Knowledge, and Involvement

As in previous work (Wood, 1982), subjects with high, compared with low, retrieval indicated that they had thought more about preservation in the past (p < .08), had taken more action in regard to it (p < .01), and had more

feelings about it ($p < .001$).[5] High, compared with low, retrieval subjects also reported that they knew more about the topic and were more involved in it (ps < .001). In addition, high retrieval subjects were more likely to be members of environmental groups such as the Sierra Club and the Audubon Society (10 members vs. 35 nonmembers) than low retrieval subjects (1 member vs. 59 nonmembers) $\chi^2 = 9.50$, $p < .01$.

Perception of the Source and Message

A factor analysis (varimax rotation) of the source ratings yielded three rotated factors which accounted for 43.6%, 17.8%, and 8.7% of the variance. The factors were labeled "Likable" (variables loading heavily on this factor were approachable, interesting, warm, sincere, likable, friendly modest), "Expert" (expert, competent, knowledgeable, well-read, intelligent), and "Open-minded" (open-minded, unbiased), respectively. Factor scores were computed for each subject.

Analysis of variance on the factor scores shown in Table 2 revealed that the manipulations of the source's attributes were appropriately perceived.

Insert Table 2 about here

The source who praised undergraduates was rated more likable than the one who insulted them, $F(1, 97) = 52.00$, $p < .001$, and the environmental geology student was considered more expert than the student of French, $F(1, 97) = 24.17$, $p < .001$. In addition, low retrieval subjects perceived the expert, geology student source as less likable than the nonexpert, French student source ($p < .05$). Also, the analyses of expertise revealed that high retrieval subjects rated the source less expert than low retrieval subjects ($p < .03$).

No effects were obtained in the analysis on open-minded.

In addition, analyses on the index of message validity indicated that likable, compared with unlikable, sources were thought to deliver fairer and more carefully thought out opinions ($p < .02$). Although we had expected source expertise to affect the perceived validity of his position on preservation, no effects for expertise were obtained. To interpret this finding, recall that the persuasive message had several parts, including the source's evaluation of UWM, which comprised the likability manipulation, along with his position on preservation. When asked to rate message validity, subjects may have assumed this referred to the evaluation of UWM. It would not be surprising, then, that expertise did not affect perceived validity.

Opinions

Analysis of covariance was conducted on the postopinions, with preopinions as the covariate. A test for homogeneity of the covariate regression coefficients indicated that they did not differ across experimental conditions. Analysis of variance indicated that the preopinions did not vary across conditions, and that preopinions ($M = 13.51$) differed significantly from postopinions ($M = 11.61$, $p < .01$).

Opinion means, which are the postopinion scores adjusted on the basis of the analysis of covariance, appear in Table 2. Analyses of these data indicated that low retrieval subjects changed their opinions more than high retrieval subjects, F (1, 96) = 11.58, $p < .01$. Further, expert sources were more persuasive than nonexpert ones, F (1, 96) = 6.95, $p < .05$, and likable sources more persuasive than unlikable ones, F (1, 96) = 8.52, $p < .01$. As predicted, the main effect for likability was modified by a significant Retrieval X Likability interaction, F (1, 96) = 4.43, $p < .05$, indicating that for low retrieval subjects, likable sources were more persuasive than unlikable ones, F (1, 96) = 15.87, $p < .001$, whereas for high retrieval subjects, source likability had no effect ($F < 1$).

These findings provide strong support for the present analysis. High retrieval recipients changed their opinions more when the source was expert than nonexpert, presumably because expertise affected the perceived validity of the source's position on preservation. They did not, however, find likable sources more persuasive than unlikable ones, presumably because likability has few implications for the validity of one's position on preservation. Low retrieval recipients, in contrast, found sources with positive attributes (i.e., expert, likable) more persuasive than sources with negative ones (nonexpert, unlikable).

Cognitive Responses

High retrieval subjects again tended to list more thoughts than low retrieval ($p < .001$), and thus all analyses were calculated on a proportion representing the number of thoughts in each category divided by the total number of thoughts listed (See Table 2).

High, compared with low, retrieval subjects generated a smaller proportion of favorable thoughts, $F(1, 97) = 22.02$, $p < .001$, and showed a tendency to generate a larger proportion of counterarguments, $F(1, 97) = 2.44$, $p < .13$. In addition, expert, compared with nonexpert, sources elicited proportionally fewer counterarguments and more favorable thoughts ($ps < .02$). A higher percent of neutral thoughts was generated by high, than low, retrieval subjects ($p < .001$). Also a higher percent of neutral thoughts was elicited by expert sources and likable ones than by nonexpert and unlikable ones, respectively ($ps < .05$).

Analyses on the origin of subjects' thoughts revealed that high retrieval subjects produced a somewhat larger proportion of recipient generated thoughts to message content than low retrieval subjects $F(1, 97) = 3.62$, $p < .06$.

That high (vs. low) retrieval recipients produced proportionally fewer favorable thoughts, slightly more counterarguments, and somewhat more recipient generated thoughts again suggests that high retrieval recipients are more likely to use information accessed from memory to evaluate the persuasive message. Also, consistent with the opinion change findings, expert sources elicited fewer counterarguments than nonexpert ones. Communicator likability, however, affected the opinion change of low retrieval subjects but had no effect on the thoughts they produced.

It is interesting to note that high levels of source expertise reduced recipients' counterarguing relative to low levels of expertise. Although this inverse relation between source expertise and counterarguing has been obtained in other research (Cook, 1969), it has not been found consistently (Sternthal, Phillips, & Dholakia, 1978). Some researchers have speculated that the inverse relation will be obtained when the message advocates a position that counters recipients' initial opinions or when recipients are uninvolved in the message topic (Hass, 1981; Sternthal, Dholakia, & Leavitt, 1978). Unfortunately, there is not enough evidence available yet to determine the limiting conditions for this effect.

Comprehension and Recall of Message Position

High retrieval recipients again tended to process the message in a way that enhanced comprehension and retention of message arguments and of the message position. High retrieval subjects recalled slightly more arguments than low retrieval subjects (*Ms* = 2.27 vs. 2.20, $p < .11$). In addition, marginally more arguments were recalled when the expert communicator was likable than unlikable ($p < .08$). High retrieval subjects were also more likely to successfully recall the advocated position (2 subjects indicated partial or no

recall vs. 43 accurate recall), than low retrieval subjects (12 indicated partial or no recall vs. 46 accurate recall), χ^2 (1) = 6.40, $p < .02$.[6]

Correlational Analysis

Analyses were conducted to explore the relation between opinion change and source and message ratings, cognitive responses, and message comprehension. Partial correlations were calculated between opinions and each of these variables, adjusted for the experimental variations--subjects' retrieval, source expertise, and source likability. A perception of the source as expert tended to enhance opinion change ($r = .19$, $p < .10$), and a perception of the source as likable was not significantly related to change ($r = .14$, $p < .16$). Opinion change had a small, marginally significant relation to favorable thoughts and to counterarguments ($rs = .17$ and $-.16$, respectively, $ps < .11$). In addition, production of recipient generated thoughts appeared to decrease opinion change ($r = -.26$, $p < .05$). Finally, high comprehension tended to enhance change ($r = .17$, $p < .10$).

GENERAL DISCUSSION

These two experiments, taken together, provide strong support for our hypotheses. First, it is important to note that in both studies, as well as in prior work (Wood, 1982), recipients with access to attitude-relevant information in memory tended to change their opinions less than recipients with little such access. This finding is consistent with the idea that recipients with high levels of retrieval utilize internal cues as well as the information provided in the message when deciding what opinion to state, whereas low retrieval recipients are forced to rely more on external data when forming attitude judgments. Additional support for these ideas was provided by the cognitive responses subjects produced. High retrieval recipients generated

proportionally fewer favorable thoughts and slightly more counterarguments than low retrieval recipients. Most important, high, compared with low, retrieval subjects drew on their own ideas and knowledge when evaluating the advocated position, and thus tended to generate a greater proportion of thoughts which did not reflect information given in the message.

In addition, high retrieval recipients appeared to engage in the careful consideration of issue-relevant arguments required by a systematic processing strategy. They apparently evaluated the message against highly valid, trustworthy information accessed from memory. In both studies, these recipients changed their opinions more when the persuasive message was designed to appear highly valid (i.e., contained strong arguments or was delivered by an expert source) than when it was designed to appear less valid (contained weak arguments or the source was nonexpert). Variations in cues which should have few implications for message validity (i.e., message length and source likability), did not affect the opinion change of high retrieval subjects. Analyses on the thoughts these subjects produced yielded findings which generally paralleled those obtained on opinion change. In both experiments, high retrieval recipients produced proportionally more favorable thoughts and slightly fewer counterarguments when the message was designed to appear valid than when it was intended to appear less valid. Variations in cues unrelated to validity had little impact on subjects' thoughts: Likability had no effect on thoughts and message length had only a marginal effect on counterarguing, such that long messages elicited fewer counterarguments than short ones.

In contrast, low retrieval recipients did not focus exclusively on the validity of the message when deciding whether to accept it. Although messages designed to appear highly valid (i.e., expert sources, strong arguments) were more persuasive than less valid ones (nonexpert sources, weak arguments), messages were also more persuasive when they were associated with positive cues presumably unrelated to validity (i.e., likable source, lengthy arguments) than when they

were associated with negative ones (unlikable source, short arguments). Consistent with the opinion change findings, low retrieval subjects generated proportionally more favorable thoughts and fewer counterarguments to expert (vs. nonexpert) sources and to strong (vs. weak) arguments. The effects of message length and source likability on subjects' thoughts did not, however, parallel opinion change: Likability had no effect on thoughts and length had only a marginally significant effect on counterarguments such that long messages elicited fewer than short ones.

It was anticipated that, for low retrieval recipients, persuasion would be mediated by simple decision rules, featuring the positive or negative cues associated with the message position. Since message length and source likability had little effect on subjects' specific evaluations of the message, as indicated by the type of thoughts they produced, these attributes apparently affected persuasion through such general processing rules. Source expertise and message validity, in contrast, had a strong impact on subjects' thoughts, and thus it is unclear whether these variables were processed in a heuristic manner. The effect of expertise and validity on thoughts suggests that the low retrieval recipients in our experiments had the ability to conduct more than a minimal evaluation of message validity. If these recipients had moderate access to internal cues, they would have been able to conduct a somewhat systematic analysis of message validity, and effects of message quality and source expertise on persuasion would be mediated by this analysis. Recipients with moderate access might not, however, be able to clearly evaluate the implications of message length or source likability for message validity, and thus might follow heuristic rules to analyze such attributes. It seems likely that for message topics which are less familiar than preservation of the environment, subjects classified as low retrieval will have only minimal access to relevant information in memory, and will be forced to rely solely on heuristic processing rules.

Correlational Analyses. Although the experimental manipulations generally had the anticipated impact on subjects' opinion change and on cognitive responses, these responses did not clearly mediate persuasion. Correlations between responses and opinions were small in magnitude and only the measure of counterarguing had a consistent relation to opinions across both experiments. To further explore the mediational role of subjects' thoughts, hierarchical regression analyses predicting persuasion were conducted for each experiment (cf. Cohen & Cohen, 1975). When the thoughts measures were entered into the regression equation before the experimental variations, the variations remained significant predictors of opinions.[7] Since previous work in this area did find that subjects' thoughts mediated persuasion (Wood, 1982), the conditions under which this mediational role can be demonstrated need to be specified. Although it is relatively common for researchers to report correlations between thoughts and opinions (Miller & Colman, 1981), more direct assessments of these mediators, through techniques such as regression analyses or structural modeling, remain relatively rare. Yet this kind of analysis is necessary if we are to clearly detail the cognitive processes underlying persuasion.

Comprehension and Retention of Message Content

Recipients' recall of message arguments and of the position advocated were evaluated for their relation to retrieval. Enhanced recall of recently learned information is thought to be one consequence of a highly articulated cognitive structure in the relevant domain (Bem, 1981; Markus et al., 1982).

In both of the present experiments, high retrieval recipients were found to recall slightly more of the message arguments than low retrieval recipients. Although no significant relation between retrieval and recall was reported in the persuasion study in prior work (Wood, 1982), inspection of the recall means revealed a tendency in the appropriate direction (*Ms* = 2.76, vs. 2.61, for high

and low retrieval recipients, respectively, n.s.).[8] In addition, the relation between retrieval and recall of the message position was analyzed in the present research. The second experiment found that, as anticipated, high retrieval subjects were more likely to correctly recall the message position than low retrieval subjects, although this finding was not obtained in Experiment 1. A similar analysis was conducted on the persuasion data collected by Wood (1982), and again high (vs. low) retrieval subjects showed a slight, though nonsignificant, tendency toward better recall of the message position.

Taken together, these findings on recall of arguments and message position suggest that access to attitude-relevant information has a small, consistent relation to comprehension and retention of new data. It is not surprising that the magnitude of this relation is small, given that the persuasive messages contained only three or four arguments and the overall level of comprehension was quite high for all recipients.

From a cognitive perspective, the relation between retrieval and message processing provides suggestive evidence that people with access to attitude-relevant information in memory have a highly organized cognitive structure in relation to the attitude topic, whereas individuals without such access have a less well articulated structure in memory. Of course, interpretation of the retrieval measures must remain somewhat tentative given the individual difference design in the present research. Yet the results of the present two studies, along with the persuasion data from Wood (1982), provide encouraging support for this interpretation.

Conclusion

This research provides evidence concerning the conditions under which message recipients engage in systematic vs. heuristic information processing. Recipients' processing strategies have been found in previous work to depend on such factors

as personal involvement and the modality through which the message is presented (Chaiken, 1980; Chaiken & Eagly, in press). The present research suggests that it is also important to consider recipients' ability to conduct a critical evaluation of message content. Recipients with access to relevant information are able to draw on these beliefs and prior experiences when evaluating a message and thus can engage in the careful consideration of issue-relevant arguments required by a systematic strategy. In contrast, recipients with less access may be forced to rely more on cognitive heuristics, or general processing rules, when deciding to accept or reject the advocated position. Extent of retrieval is, of course, only one of many factors affecting recipients' ability to critically analyze a message. It seems likely that other factors related to ability, such as message repetition and distraction, will have effects on message processing and persuasion similar to those observed in the present research.

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Footnotes

1. The effects of retrieval on opinion change do not appear to be a function of motivational factors such as recipients' involvement in the message topic. Although retrieval proved to be positively correlated with involvement in prior work, retrieval's effects on opinion change are not consistent with traditional analyses of involvement (see Wood, 1982).

2. When retrieval of beliefs and retrieval of behaviors were employed separately in the analyses, the behaviors variable proved to be a stronger predictor of opinion change than beliefs. Yet the relation between beliefs and opinions was in the same direction as that between behaviors and opinions. For ease of presentation, the two retrieval measures were combined into an index in the reported analyses.

3. The main effect for length was qualified by a marginally significant interaction between length and retrieval ($p < .10$). High retrieval recipients considered the communicator significantly more expert when his message was long rather than short ($p < .05$), whereas low retrieval recipients' ratings of expertise showed a nonsignificant trend in the same direction.

4. Analyses including subject sex as an additional variable yielded no differences between males' and females' persuasibility and no systematic differences on other measures. This variable was therefore not included in the reported analyses.

5. In addition, subjects who read a message from a likable (vs. unlikable) communicator reported having thought more about preservation ($p < .05$). Also, an interaction between retrieval and expertise ($p < .05$) revealed that only the high (vs. low) retrieval subjects who read a message from an expert source reported having engaged in more prior action ($p < .01$).

6. Two low retrieval subjects did not complete the position recall measure.

7. For Experiment 1, counterarguments, favorable thoughts, and recipient generated thoughts were entered into the regression equation before message length, message quality, and retrieval. In Experiment 2, the thoughts variables were entered into the equation before source expertise, source likability, retrieval, and a term representing the interaction between likability and retrieval. In addition, when these equations were constructed separately for low and high retrieval recipients, thoughts did not mediate persuasion for either group.

8. In Wood (1982), the effects of belief and behavior retrieval were analyzed separately. To make the analysis comparable to the procedure in the present research, the recall data from the persuasion study were reanalyzed using a median split on the sum of the belief and behavior retrieval measures.

Table 1

Mean Source and Message Ratings, Postopinions, and Cognitive Responses as a Function of Subjects' Retrieval, Message Length, and Message Quality

	Low Retrieval				High Retrieval			
	Long message		Short message		Long message		Short message	
	Strong message	Weak message	Strong message	Weak message	Strong message	Weak message	Strong message	Weak message
Perceived message validity	10.70	5.86	10.72	5.75	11.05	6.34	9.40	5.17
Perceived source expertise	11.13	8.27	10.80	8.17	11.67	8.37	10.08	6.30
Adjusted post-opinions	5.21	4.32	3.82	3.95	4.03	2.95	3.95	2.77
Favorable thoughts	.33	.01	.30	.04	.23	.03	.06	.00
Counter-arguments	.50	.85	.54	.92	.57	.87	.82	.91
Recipient generated thoughts	.25	.16	.20	.17	.28	.24	.44	.17

Note. Higher numbers represent perception of message as more valid, perception of source as more expert, greater opinion change, and a larger proportion of thoughts.

Table 2

Mean Source Ratings, Postopinions, and Cognitive Responses as a Function of Subjects' Retrieval, Source Likability, and Source Expertise

	Low Retrieval				High Retrieval			
	Likable Source		Unlikable Source		Likable Source		Unlikable Source	
	Expert Source	Nonexpert Source	Expert Source	Nonexpert Source	Expert Source	Nonexpert Source	Expert Source	Nonexpert Source
Perceived likability	.29	.72	-.85	-.33	.80	.40	-.32	-.62
Perceived expertise	.47	-.35	.58	-.08	.31	-.48	.15	-.90
Adjusted postopinions	6.33	5.44	4.21	3.90	4.29	3.46	4.48	2.68
Favorable thoughts	.50	.37	.56	.40	.27	.20	.28	.17
Counter-arguments	.36	.50	.38	.60	.42	.60	.45	.71
Recipient generated thoughts	.18	.26	.09	.24	.19	.32	.38	.34

Note. Higher numbers represent perception of source as more likable, more expert, greater opinion change, and a larger proportion of thoughts.